CLAIMS

What is claimed is:

1. A method for preparing an article made of a nickel-base superalloy strengthened by the presence of a gamma-prime phase, comprising the steps of

providing an initial article of the nickel-base superalloy; thereafter

solution heat treating the nickel-base superalloy at a solutionizing temperature above a gamma-prime solvus temperature of the nickel-base superalloy; thereafter

first quenching the nickel-base superalloy in a first molten salt bath maintained at a temperature of from the gamma-prime solvus to about 100°F below the gamma-prime solvus temperature; thereafter

second quenching the nickel-base superalloy in a second molten salt bath maintained at a temperature below an aging temperature of the nickel-base superalloy; and thereafter

precipitation heat treating the nickel-base superalloy at the aging temperature to precipitate an aged microstructure comprising gamma prime phase in a nickel-base matrix.

2. The method of claim 1, wherein the article has an average grain size coarser than ASTM 10 at the conclusion of the step of solution heat treating.

3. The method of claim 1, wherein the step of providing the initial article includes the step of

providing the initial article having a largest thickness dimension of not less than about 3 inches.

4. The method of claim 1, wherein the step of providing the initial article includes the step of

providing the article wherein a difference between a greatest section thickness and a smallest section thickness is at least about 2 inches.

5. The method of claim 1, wherein the step of providing the initial article includes the step of

providing a gas turbine disk blank wherein a difference between a greatest section thickness and a smallest section thickness is at least about 2 inches.

6. The method of claim 1, wherein the step of first quenching includes the step of

maintaining the nickel-base superalloy in the first molten salt bath for a time of at least about 5 minutes.

7. The method of claim 1, wherein the step of first quenching includes the step of

maintaining the nickel-base superalloy in the first molten salt bath for a time of from about 5 to about 30 minutes.

8. The method of claim 1, wherein the step of second quenching includes the step of

maintaining the nickel-base superalloy in the second molten salt bath for a time of at least about 10 minutes.

9. The method of claim 1, including an additional step, after the step of second quenching and before the step of precipitation heat treating, of

cooling the nickel-base superalloy to room temperature.

10. The method of claim 1, including an additional step, performed after the step of second quenching and before the step of precipitation heat treating, of

stabilize heat treating the nickel-base superalloy at a stabilizing temperature of from about 100°F to about 200°F above the aging temperature.

11. The method of claim 1, wherein the step of precipitation heat treating includes the step of

precipitation heat treating the nickel-base superalloy to produce the aged

microstructure having a volume percentage of gamma prime phase of at least about 40 percent.

12. The method of claim 1, including an additional step, after the step of precipitation heat treating, of

machining the nickel-base superalloy.

13. A method for preparing an article made of a nickel-base superalloy strengthened by the presence of a gamma-prime phase, comprising the steps of

providing an initial article of the nickel-base superalloy; thereafter

solution heat treating the nickel-base superalloy at a solutionizing temperature above about 2030°F; thereafter

first quenching the nickel-base superalloy in a first molten salt bath maintained at a temperature of from about 1930°F to about 2000°F; thereafter

second quenching the nickel-base superalloy in a second molten salt bath maintained at a temperature of from about 900°F to about 1300°F; and thereafter

precipitation heat treating the nickel-base superalloy at an aging temperature of from about 1300°F to about 1500°F.

14. The method of claim 13, wherein the article has an average grain size coarser than ASTM 10 at the conclusion of the step of solution heat treating.

15. The method of claim 13, wherein the step of providing the initial article includes the step of

providing a gas turbine disk blank wherein a difference between a greatest section thickness and a smallest section thickness is at least about 2 inches.

16. The method of claim 13, including an additional step, performed after the step of second quenching and before the step of precipitation heat treating, of

stabilize heat treating the nickel-base superalloy at a stabilizing temperature of from about 100°F to about 200°F above the aging temperature.

17. The method of claim 13, wherein the step of precipitation heat treating includes the step of

precipitation heat treating the nickel-base superalloy to produce the aged microstructure having a volume percentage of gamma prime phase of at least about 40 percent.

18. A method for preparing an article made of a nickel-base superalloy strengthened by the presence of a gamma-prime phase, comprising the steps of

providing a gas turbine disk initial article the nickel-base superalloy, wherein the initial article has a thickness dimension ranging from about 2 to about 7 inches; thereafter

solution heat treating the nickel-base superalloy at a solutionizing temperature of from about 2050°F to about 2150°F; thereafter

first quenching the nickel-base superalloy in a first molten salt bath maintained at a temperature of from about 1930°F to about 2000°F and maintaining the nickel-base superalloy in the first molten salt bath for a time of at least about 5 minutes; thereafter

second quenching the nickel-base superalloy in a second molten salt bath maintained at a temperature of from about 900°F to about 1300°F and maintaining the nickel-base superalloy in the second molten salt bath for a time of at least about 10 minutes; and thereafter

precipitation heat treating the nickel-base superalloy at an aging temperature of from about 1300°F to about 1500°F.